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ABSTRACT

Presented is the curriculum theory designed for 400 gifted boys and girls, from rising junior and senior classes in high school, who attend the 8-week summer Governor's School (GS) of North Carolina. The main aim of the GS is given to be inspiring and guiding future leaders by providing opportunities for special aptitude, general conceptual, and personal/social development. The curriculum theory is said to challenge gifted students' theoretical ability with up-to-date theories in various fields of arts and sciences. It is maintained that theory rather than facts helps students cope with world views on the new physical universe of space-time and fluent process, new depth psychology concerning human behavior, and new moral and theological doctrines concerning man in the universe. Differential and learning characteristics of the gifted are reviewed to indicate the GS's rationale for centering on "conceptual intelligence". Examined in detail is an abstractive model of the mind which requires progressive inward movement from the concrete through stages of inspection (sensory), perception, imagination, and intellection to the undifferentiated continuum (unconscious or preconscious level) where the creative process occurs, and return to the concrete armed with interpretative theory. Reference is made to the concept of withdrawal and return of A. Toynbee. Area II for general conceptual development is seen to include reorganization of the logical structure of thought and avoidance of old types of language for interpreting reality. Area III is said to focus on teaching students the mechanisms of creativity and anxiety through use of the model. (Included is a streamlined illustration of a lesson in 20th century music showing in dialog form how the teacher leads students through deeper levels of thought to the abstract.) (MC)

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Opening Windows Onto The Future

Theory of the Governor's School of North Carolina

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INTRODUCTION

The Governor's School of North Carolina is an eight-week summer program for gifted high school pupils, located in Winston-Salem on the campus of Salem College, all whose facilities plus those of adjoining Salem Academy are available for use.

The school grew out of a proposal that originated in the office of Governor Terry Sanford. Financial support for the first three-year project (1963-1965) was provided by a grant from the Carnegie Corporation of New York and matching contributions from business firms and foundations of Winston-Salem. At the end of the first three-year experimental phase, the program was taken over by the State of North Carolina, and is now a permanent part of the state's educational program.

The administration of the program is under the general authority of the State Board of Education and the special authority of a twelve-man Board of Governors. An executive committee of the latter board and an administrative staff are directly responsible for conduct of the school.

Four hundred boys and girls are chosen each year from the rising junior and senior classes of high schools in the state on the basis of merit. Pupils are recommended by their local superintendent of schools on the basis of intelligence, talent, and achievement. Final selections are the result of screening processes conducted by special judges appointed by the GS administrative staff. No pupil may attend more than one summer session of the school. Board, room, laundry, and instructional materials are furnished free to the pupils.

Main aim: Inspirational guidance

From the ranks of these youngsters are expected to come many of the future leaders in all fields of knowledge and endeavor for our state and nation. The GS is designed to play a small but significant role in preparing these gifted youngsters for their future tasks of creative leadership.

It is obvious that a short period of eight weeks once in a lifetime is insufficient to give anything like a solid mastery of a field of knowledge or to perfect an important talent. Therefore, the GS conceives its role more as one of inspirational guidance and prognosis than as one of giving pupils a mastery of anything.

OPEN WINDOWS ONTO THE FUTURE: acquaint these future leaders with the latest theories and techniques in their chosen fields--introduce them to some of the present thorny problems in the field--inspire them to creative activity on their own--all these suggest the particular orientation of the GS.

No Marks and Grades

Artificial motivation furnished by school marks has been removed: no unit credits are given for participation in the program. The curriculum is designed to SUPPLEMENT--not to supplant--the offerings of the local schools, and includes more subjects than does the traditional high school program, both from the fine and performing arts as well as from the academic disciplines. The whole program is exploratory in nature, seeking to transcend the framework of established curricula in order to project new theories and to invent new practices that may hold promise for improved education of the gifted.

The GS curriculum has three main "Areas" of learning activity, each with its own emphasis on an important aspect of personality development, and yet all three thoroughly integrated and complementary.

Area I: Special Aptitude Development

This is the area where lies the pupil's special talent or giftedness, on the basis of which he or she was chosen to attend the Governor's School: Dance, Drama, English, French, Mathematics, Music (choral, instrumental, piano), Natural Science, Painting, Social Science.

About two-thirds of a pupil's class time is devoted to Area I. Teaching materials used in this area are chosen with a view to acquainting pupils with the latest developments in the field of the specialty, and pupils are encouraged to anticipate and to speculate concerning possible solution of problems and developments likely to arise in their field of specialty in the future.

Area II: General Conceptual Development

In this Area the pupil is expected to expand interests and knowledge beyond his own concentrated specialty to include the whole spectrum of advancing knowledge. Here are emphasized integrative principles of knowledge, by which narrow specialties are transcended and seen as incomplete parts of a larger whole. A course in the "logic of the sciences and the humanities" forms the nucleus of study in this Area, supplemented by selected readings from the Great Books of the Western World series.

About one-sixth of the pupil's time at the GS is devoted to Area II. F. S. C. Northrop's The Logic of the Sciences and the Humanities (New York, 1947) was used as a unifying text during the summer sessions of 1967 and

1968, and Dr. Northrop himself spent three days in July 1968 on the campus as lecturer and consultant.

Area III: Personal and Social Development

Gifted persons and leaders, by definition, are outstanding, and, consequently, are many times looked upon as being eccentric (sometimes expressed as "un-democratic" in a highly mistaken use of the term). Thus, our gifted leaders often have special problems of adjustment: of understanding themselves and of relating properly to society. For example, far too often highly intellectual persons or academically talented ones are dubbed "eggheads" and "screwballs." If a person so dubbed does not understand the motives of such dubbing, or does not otherwise have psychological insight into the meaning of this social phenomenon, he may be caused, by pressure of fear of being rejected by his social peers, to suppress development of his giftedness. Much creativity and leadership is lost to society by reason of this vicious treatment of our creative and innovative talent.

Through study of the psychological problems involved in being gifted, and by becoming acquainted, through reading the biographies of talented people of the past, with methods that others have used for solving such problems, gifted pupils are prepared to strengthen their personalities through the resulting insights, so as to free them for fullest development of their capacities.

Learning from one's peers

Through the experience of associating with four hundred highly intelligent and talented youngsters that are their peers, two things usually happen to youngsters who attend the Governor's School: first,

they mutually stimulate each other and discover that there are many other youngsters like themselves, so that after all, they are not freaks and social misfits; second, they are thoroughly humbled, perhaps for the first time in their lives, when they find out that there are other young roosters in the barnyard whose combs may be redder than their own.

Discovering new ways

Thus, the Governor's School seeks to OPEN WINDOWS ONTO THE FUTURE for the state's most gifted youngsters, seeking thus to prepare them for the productive role they will be playing in the Twentieth Century Revolution, which is fast snowballing toward the fantastic future of the Twenty-first Century, when, as Alfred North Whitehead says, "there will be no appeal from the judgment which will then be pronounced on the uneducated."

Throughout all these efforts, the Governor's School expects to reap insights into new ways of educating the gifted and to find out more about their needs.

CURRICULUM: THEORY AND DESIGN

The Challenge

Educators have long recognized the principle of a special or differential type of program for certain special types of learners, such as the blind, the deaf and dumb, the under-achiever: in short, the handicapped of various sorts. However, recognition of the need for a special type of education for the gifted seems to be more recent. The most usual treatment for the gifted in the past was to put them ahead one, two, or more grades according to their ability to perform. But, this mere acceleration of the gifted pupil within the established curriculum has proved to be, in the opinion of many, a pseudo-solution of the problem. Hence, the tendency more recently of educators to accept the principle of a differential education for the gifted.

The platitude "If it's good for the gifted, it's good for all" has been rejected, and a more defensible position that "If it's appropriate for the superior learner, it's improper (perhaps impossible) for the generality of students" has been adopted. This radically differential approach seems justified on the basis of the observed differences between the gifted and non-gifted (relatively) adults in our society. The gifted individual, who innovates and remolds society, must necessarily become reconstructively divergent in thought and attitudes whereas, one who participates in and maintains society as it is remains predominantly convergent. Should not, then, the educational patterns for the two contrasted types be distinguishable and distinctive?

Educators in North Carolina have recently seen the need for a differential education for the gifted and have established a program for the exceptionally talented. The program was established by a legislative act in 1961, and provides financial resources and supervisory aid for local school systems to encourage the initiation and development of recognized types of program adaptations benefiting the academically able student. The Governor's School is a part of this state-wide program to meet the needs of a differential education for the gifted.

The Role of Theory in Education

A story goes that the extinct dodo bird flew backwards because it wanted to see only where it had been and cared little about where it was going. Thus, the dodo seems to have been a "pragmatist": a lover of stubborn fact with a tough-minded disdain of "egg-heads" and theory. Perhaps that is why the dodo became extinct.

The value of a scientific approach to matters seems to be that it furnishes sound and powerful theory about some generalizable aspects of fact, on the basis of which we may predict and thereby perhaps control what future facts (events) are likely to be, so that we may govern our conduct accordingly. It would seem evident that this cannot be done without sound, precise, clearly stated theory.

Furthermore, evaluation of fact and practice does not seem possible on their own grounds without considering their purposeful relationship with some theory: objects and events are not good of themselves, but are good FOR some theoretical goal or purpose. An airplane flight for the purpose of getting efficiently to Chicago must be deemed a failure if it arrives at Miami, Florida instead, no matter how pragmatically smooth may have been the purring of the motors, what a nice

time the passengers may have had on the trip, and how much more pleased they may have been to be in Miami rather than Chicago.

Making this analogy pertinent to the Governor's School, it would be indulging in boosteristic nonsense to evaluate it to be a "great success" on the basis of how spectacular it might appear to the hurried visitor, or how "well organized" it might seem to be, or what a "significant" and "exciting" experiment just the idea of it might seem to make it. Such vacuous ballyhoo--too often encountered in evaluation of educational projects--must be eschewed in any honest appraisal. The proper way to judge the success, and the extent of that success, is to state THEORY: purposes, objectives, and hypotheses; and then to devise accurate means for testing their achievement.

Believing that this theory about theory makes sense, the administration and staff of the Governor's School has sought from the beginning to develop a theory to guide in the operations of the school, and to evaluate the theory from time to time in order to base appropriate revisions upon these evaluations.

A first staff report stating succinctly and completely the theory of the school was prepared at the end of the summer session of 1965. A thorough evaluation of the theory of the school and its performance was made during the summer of 1966 by Dr. James J. Gallagher. The full report of his evaluation appeared in August of 1967. Changes in the theory and practice of the Governor's School that were recommended in that report have been effected during the program of the summer of 1968.

Differential Education for the Gifted

The Governor's School is a departure from tradition: it is a special school, and is for the "gifted." The school is based on the

assumption that a select group of secondary school pupils who are endowed with superior intelligence and creativity should have educational treatment that differs from the usual programs of the local public schools, except in those cases in which a public school system provides its own significant program of differential education for the gifted in accordance with the 1961 legislation of the state legislature.

Thus, the basic aim of the Governor's School may be said to provide what may be stated succinctly in the phrase "Differential Education for the Gifted"; but this basic aim will, of course, be further adapted to the special nature of the school: for example, the school operates at the state level, bringing together all at once a far greater number of gifted pupils than could be assembled by any local public school system of the state, and, again, the school lasts for only eight weeks each summer, and may be attended only once by a pupil.

The distinctive experiences which should constitute a differential education for the gifted are still in the realm of hypothesis. Therefore, one of the basic aims of the Governor's School has been to explore and determine more precisely what these experiences should be, and to serve as a sort of pilot program. The theory and practice that is set forth in this report, although quite hypothetical and tentative, is what the administration and staff of the school have judged to be the best approach to the solution of the problem confronting them at this time.

The Need for Creative Leadership

One important justification of a differential education for the gifted was brought vividly to life by the first Russian "sputnik."

This spectacular achievement challenged complacency and focused attention upon part of the rationale which underlies the Governor's School: the need for highly trained creative leaders in the nation and its states.

Sputnik I was a sharp reminder that civilization moves today at a dizzy pace, and that the nation which does not keep abreast of complex scientific, technological, economic, political, and cultural developments will find itself quickly outstripped. Alfred North Whitehead, one of our great 20th century thinkers, in his Aims of Education, said in this regard:

> "... In the conditions of modern life the rule is absolute, the race which does not value trained intelligence is doomed. Not all your heroism, not all your social charm, not all your wit, not all your victories on land or at sea, can move back the finger of fate. Today we maintain ourselves. Tomorrow science will have moved forward yet one more step, and there will be no appeal from the judgment which will then be pronounced on the uneducated."

If a differential education for the gifted can be shown to speed up significantly the formation of creative leaders in all areas of cultural development, then it appears to be justified.

Emphasis on THEORY needed

Some observations that have emerged from the educational stock-taking that resulted from Sputnik I may give clues to what the distinctive experiences of a differential education for the gifted should be.

Education in the United States, with popular emphasis on instrumentalism, seems to have been (and still is) strongly oriented toward technology or practice, and to be comparatively weak in basic research or theory. In this country, many technological experts are produced in all fields of applied knowledge; but Europe is still relied on

heavily for theoreticians and theory. Since theory must precede practice, there is a need for emphasis on theory in the education of leaders. Hence, it follows that one distinctive characteristic of a differential education for the gifted should be an emphasis on theory rather than on facts and practical applications. (A strong caveat should be entered here: emphasis on theory does not mean that fact and practice should be disregarded, especially fact. The proper balance may be illustrated by a reported story about Whitehead: when asked which he thought to be most important, ideas or facts, he answered: "Ideas about facts." Ideas, of course, should be emphasized; but ideas in a vacuum caused by lack of facts are useless and may be dangerous: ideas, to be true and adequate, must refer to and explain the facts.)

Thus, a curriculum for the gifted--based on their superior theoretical ability--should emphasize theory and imaginative or inventive extrapolation into far ranging fields. Only this type of activity, furthermore, satisfies the superior curiosity of the gifted pupil and saves him from the boredom of too much emphasis on repetitive factual learning.

The Knowledge Explosion

This type of curriculum--pitched on a high level of theory and learning of principles rather than of facts--is becoming more and more imperative for other reasons. It has been pointed out frequently that more "scientific" facts have become known in the past ten years than in the previous ninety. This points up the growing problem of education today in all fields: how to master the growing number of facts in any one field?

One answer to this question given by creative leaders gathered at the Woods Hole Conference in 1959 is reported in Jerome S. Bruner's The Process of Education (1960) as follows:

> ". . . The dominant view among men who have been engaged in preparing and teaching new curricula is that the answer to this question lies in giving students an understanding of the fundamental structure of whatever subjects we choose to teach .... The teaching and learning of structure, rather than simply the mastery of facts and techniques, is at the center of the classic problem of transfer."

Thus it is that based on the learning characteristics of the gifted also, and on the needs of the knowledge-explosion situation in education today, a program for education of the gifted should emphasize theory and structure: principles over facts (but! principles about facts).

Leaders Need Up-to-date Theory

The theory to be emphasized, however, must be up-to-date current theory (when, of course, the theory is not just a prestigious fad, but recommends itself for sound reasons). For example, a person living in Modern Times (16th-19th centuries) who was expert in the type of theory characteristic of the Scholasticism of the Middle Ages was anachronistic and usually proved incompetent as a leader in his own time. Likewise today, a person still imbued with the "commonsense" or "Newtonian-Euclidean" type of theory that has dominated Modern Times would not likely be a creative leader in the vanguard movements of thought in the 20th century.

Therefore, not only must theory be emphasized, but it must be the theory which is revolutionizing thought in all realms of contemporary culture. (A strong caveat should be entered at this point: the preceding emphasis on "up-to-date" and "revolutionary" theory

should not be interpreted to mean some sort of shallow cultic worship of the "new" coupled with snobbish scorn of what is "old-fashioned." The fact that in Area II the GS devotes a section of its program to the study of some of the "Great Ideas" of the past as set forth in the Great Books of the Western World series should be proof enough for the careful and unbiased reader.)

Short Summer Session makes GS Special

The foregoing remarks about "theory" are applicable to all educational programs for the gifted. But the Governor's School is an even more special type of school, a summer school. Pupils come to the GS for seven or eight short weeks and only once in a lifetime: therefore, mastery of fundamentals and solid preparation in a discipline are out of the question. Solid mastery--in any legitimate interpretation of the term--of any theoretical subject matter, or of any basic skill or technique, cannot be a primary aim of the GS. For example, it will undoubtedly continue to be true, as it has been in the past, that some pupils will come with poor backgrounds in the basic essentials--who may need training, for example, in the rudiments of writing a correct English sentence, or of correct fingering in playing violin or piano--but the GS is not a remedial summer school: training in "basics" cannot be its primary goal (nor even receive much secondary emphasis). What the GS can and should do is give its pupils, the future cultural leaders of the state and nation, an inspirational and curiosity-whetting peek into the latest accomplishments, problems, theories in the various fields of the arts and the sciences.

OPEN DOORS ONTO THE FUTURE for a gifted few who will be shaping that future! That is the guiding slogan of the Governor's School. In

the light of this slogan, the planning of materials for use at the GS is guided by the following questions: What are the latest developments (emphasis on theory!) in the field? How do these developments relate to the over-all view of the world being forged in our 20th century? What materials can be found or made up that best answer these questions at the high school level?

Main Aim of GS: Emphasize Latest Theory

The main aim of the Governor's School, therefore, may be summed up in two doctrinal postulates: (1) that theory for interpreting facts be emphasized rather than mere facts, (2) that the theory emphasized should include the most up-to-date vanguard ideas that are stimulating innovational thinking in all areas of knowledge.

In a differential education for the gifted, the usual cultural lag of twenty to fifty or even more years between the discovery of new knowledge and proposal of new theories and the incorporation of this knowledge in the textbooks and courses of study of the regular public schools must be bridged: otherwise, it simply isn't "differential" in its most important aspects.

The 20th Century Revolution in Thought

Nowadays, one can hardly pick up a book or a magazine without reading something about the revolutions taking place in all areas in this our 20th century. Of course, the most obvious and spectacular is the technological revolution. Because of the concrete tangibility of the novel technical gadgets, we see and feel their impact on our daily lives. And, these technical advances are not unimportant: technology is radically changing economic conditions, with consequent

repercussions in political, educational, and even religious realms of both thought and practice.

However, far more radical and revolutionary in consequences are the new scientific doctrines and theories behind the more tangible and, consequently, more obvious technical advances. The new theories and doctrines plunge deeper than superficial technical changes into the very roots of man's mind and soul, and are giving us a radically reformed world-view: (1) a strange new physical universe of space-time and fluent process; (2) a strange new depth psychology that revolutionizes our notions concerning human nature, and (3), consequent upon the previous two, all sorts of strange new moral and theological doctrines concerning man and his relations with the universe.

Copernican Revolution is being dwarfed

We remind ourselves of the Copernican Revolution, which put an end to the world-view of the Middle Ages and ushered in the Renaissance and Modern Times (16th-19th centuries, excluding 20th), with its radically changed views concerning the nature of the universe (heliocentrism, for example), the nature of man and society, and the consequent new conceptions of man's relationship to the universe and God.

More than a hundred years were necessary for the transition to complete itself, filtering down through the cultural lag from the vanguard leaders, who forged the new world-view, to the majorities, who merely followed and adapted themselves, at times only too slowly. (We can still find here and there in out-of-the-way cultural eddies vestiges of the world-view of the Middle Ages.)

In our own 20th century, we are witnessing--if we can believe some of our cultural historians--another revolution in our world-view

that makes the Copernican Revolution look like a tempest in a teapot. The comfortable "commonsense" (naive realistic) view of the nature of the universe, based on Euclidian geometry and Newtonian mechanics, is crudely valid for only a small part of our present experience of the world. So-called "commonsense" type three-dimensional geometry serves fairly well in the calculation of distances, areas, and volumes in the everday medium range of our experience; but the minute one starts calculating distances inside the atom or in interstellar space, a new four-dimensional type geometry must be used. Relativity physics and quantum mechanics, the further they penetrate into the infinitesimally large and small, do not follow "common sense": they even do violence to it. For example, try out your "commonsense" view of reality on the following quotation from J. R. Major's The Western World (1966):

> ". . . The methods Einstein used are too complex to be explained adequately in a history text, but the conclusions he reached must be considered. Time and space, he found, are not absolute, but relative. They are interwoven into what he called a time-space continuum. Time, in short, is a sort of fourth dimension. If a spaceship traveling at 99 per cent of the speed of light went to the star Procyon and returned, the time of flight measured by an earth calendar would be twenty-one years, but the clock on the spaceship would indicate only a three-year lapse of time and the space traveler would have aged by only three years. Voyages to the most distant points of the universe are therefore theoretically possible. A space traveler would age only 27.5 years in a voyage to the Andromeda galaxy, but when he returned to the earth, he would be fortunate indeed if the nation that sent him still existed or even if the homo sapiens still dominated our globe, for three million earth years would have elapsed."

Many comparable quotations from books on depth psychology could be offered to demonstrate that the ordinary "commonsense" view of the nature of man is no more tenable than the commonsense view of the nature of the universe.

Einstein, Planck, and Freud are the three great pioneers that seem to be most frequently recognized as having undermined the so-called

"commonsense" (or naive realistic, to use the technical term of philosophy) world-view that developed in our Western culture during the four centuries of Modern Times.

GS Aim: Emphasize 20th Century Revolution

Can, then, the GS conscientiously pretend to fulfill its mission of providing in some measure a differential education for the future intellectual leaders of our country if it does not arouse their curiosity concerning and enthusiasm for research into the nature of this 20th century revolution?

Teachers at the GS in the last several years have shown that they have had difficulty in accepting the challenge reflected in the preceding question. They sometimes ask: "How can we be expected to teach our pupils what this new world-view of the 20th century is when we do not understand it ourselves?"

The answer given at the GS is that nobody expects pupils to be taught what is the new world-view: nobody knows definitely what it is or what it will be, it is in the process of formation. Not even the most outstanding leaders of the world could give a clear outline of the new world-view, as we can now, from hindsight, of the world-view of Modern Times that is now being replaced gradually by the new. We are in the very beginning of the revolution.

What is expected of teachers at the GS is not to play authoritarian teacher in order to tell pupils what is the new world-view, but to play the role of a wide-awake inquirer leading future leaders in the process of forging the new world-view. Furthermore, it is not as if we at the GS were struggling alone: vanguard explorers from all over the world in all areas of knowledge are giving us the new science,

the new math, the new psychology, the new art, the new criticism, the new morality, even the new theology (God is dead?), and the new what-have-you! Can we not place these "new" thoughts and theories before our charges and lead them to explore them, to seek to base them on something fundamental, to seek the relations among all the disciplines? If the ideas and theories are "new" to us the teachers as well as to our pupils, so much the better. We teachers will be learning something in the process. The teacher who would be afraid of such a challenge probably would not be qualified for the staff of the GS.

Differential characteristics of the gifted

The theory of the GS arises also out of the differential characteristics--both personal and learning characteristics--of the gifted pupils who attend the school.

It is risky to make firm statements about the personality characteristics of gifted young people, but some cautiously accepted generalizations may be offered in a tentative and experimental spirit.

It will be good to begin with contradiction of one wide-spread prejudice about gifted children: that they are social misfits or "screwballs" in proportion to their giftedness. The opposite seems to be true. Gifted children are frequently more popular and take more part in social activities, especially as leaders, than do the less gifted. Gifted children, especially those with high IQs, consistently show up on personality tests as having fewer problems than do children of average groups.

Gifted children seem to be less conforming to accepted opinions than average children: in other words, ability to think more efficiently

seems to mean also ability to think for oneself and to think with originality. This independence in thinking implies more strength of character, which carries over into all areas of conduct with other people: gifted youngsters are not prone to follow the herd.

The gifted seem to have more mental stamina than do average children: they can work with their minds longer and more concentratedly, they can work alone better, they have more curiosity, their range of interests is broader.

Learning characteristics of the gifted

As to learning characteristics, high IQ, of course, has in the past been identified with high general learning ability (motivational problems being equal). Children gifted with high IQs can be expected reliably to be efficient learners of matters in general, but recent research points up the need for more subtle tests (such as the Terman Concept Mastery Test) for intelligence testing of the gifted, and for different kinds of tests (such as the recent so-called 'creativity' tests) to identify varied aspects of giftedness.

IQ tests still seem to be quite reliable and valid for identifying giftedness in learning ability of a general nature up to a certain cutoff point (Binet 120 is popular), but beyond this point a higher IQ cannot be correlated with the more creative types of learning and thinking. The work of Getzels and Jackson (repeated confirmingly by others) shows that children can have a high IQ and be low in creativity, or, vice versa, be high in creativity and have a comparatively low IQ. However, an IQ of at least 120 seems to be necessary for any kind of creative behavior.

Giftedness means Theorizing ability

The emphasis on theory already mentioned seems to be justified by the differential characteristics of gifted individuals. The more that is learned about the nature of intelligence and creativity, the more it appears that theoretical ability is the key factor in both. This point of view is implied in the following quotation, for example, from a recent study by Harvey, Hunt, and Schroder, Conceptual Systems and Personality Organization (John Wiley, 1961):

> ". . . The greater one's abstractness, (1) the greater is his ability to transcend immediacy and to move more into the temporally and spatially remote, (2) and the more capable he is of abstracting relationships from objects of his experience and of organizing them in terms of their interrelatedness."

Of course, the ability implied in this quotation--transcending immediacy, abstracting relationships, reintegrating them innovatively--is what we are calling "theoretical" ability.

Then, the most basic learning characteristics of giftedness may best be summarized as the ability to learn principles that give mastery over broad areas of particular facts, and to extrapolate imaginatively (inventively) beyond the level of fragmented bodies of immediate fact in order to operate on a broader level of generalization, interpretative synthesis, and reconstructive application--in short, to operate on a deeper level of theoretical activity and vision.

Theory about Giftedness dictates GS Practice

All curricular materials and teaching practices at the GS arise cogently out of the school's guiding theory concerning the nature of giftedness. This giftedness constitutes the differential nature of pupils at the GS, and if we mean to make simple honest sense, we must design a differential curriculum that aims clearly at providing maximum

opportunity for exercise and development of the elements of giftedness, whatever they may be judged to be: intelligence, talent, creativity.

Let us not misunderstand ourselves nor be misunderstood. We must know and remind ourselves constantly that our knowledge of what constitutes giftedness (and supposed elements such as intelligence, talent, creativity) is both meager and fuzzy. However, it would be a blunder to conclude therefore that we should adopt any sort of overly cautious, opportunistic policy of noncommitment to any theory at all for fear of following a mistaken one. The way to get solid and adequate knowledge as to what is giftedness and what are the means of educating the gifted is to formulate hypotheses boldly and clearly, systematizing them with rigorous logic into coherent theory, and then testing the theory for adequacy by rigorous experimental application.

If the hypotheses are not clearly and rigorously formulated, one never knows what it is that experience and experiments have tested. If theories are not loyally and rigorously applied in experiment, one never knows whether or not they have been confirmed. BUT--and the caveat deserves emphasis--we must constantly remind ourselves and others that our hypotheses and theories are just that. When experimental tests and experience indicate fairly that they are false or inadequate, we must be ready to gracefully abandon them, or to shore them up enough to make them adequate to the observable evidence.

GS Theory Emphasizes Intellect

GS theory about giftedness is frankly intellectual, defining the intellect as 'conceptual intelligence'. This calls for clarification of certain basic terms used here.

'Intelligence' may be defined as the ability to solve problems by apperception of relations among the factors of a problematic situation. In problematic situations, intelligence invents or discovers a key pattern or structure which serves to unlock the problems. Let us illustrate.

Here are the factors of a problematic situation taken from a classic experimental example: a hungry chimpanzee in a cage... a banana eight feet away outside the cage... one stick three feet long and with a socket on one end placed in one corner of the cage... in another corner, a second stick three feet long with a small rake on one end, the other end of which fits into the socket on the other stick... the chimpanzee's arm is two and one-half feet long. The problem: Can the chimp get the banana? Can he apperceive (invent? discover?) the patterned key structure of factors and relations: stick-to-stick-to-arm-to-banana, etc? Based on well-known experimental evidence, we know that the answer is "yes." Then, by definition, the chimpanzee has intelligence.

A further distinction needs to be made. Suppose that you, the reader, are asked the question: "If the situation is as described, can the chimp <u>really</u> get the banana?" When you are reassured that no trick is involved in the question, you answer: "Well, of course! Two sticks each three feet long that fit together, plus arm two and one-half feet long... that makes eight and one-half feet... plenty long enough to rake in the banana which is eight feet away." Of course, you are correct: you, too, have apperceived the patterned key structure that unlocks the problematic situation: you, too, dear reader, are intelligent!

BUT--and this is the clinching point--there is a radical difference in the types of intelligence shown by the chimp and you. The chimp solved the problem by manipulating the actual physical objects: cage, sticks, arm, banana. It manipulated actual physical factors and relations, present to consciousness in sensuous immediacy. But, when you solved the problem, where were the sticks, cage, banana, etc? You manipulated substitute tokens (words or terms) or 'concepts', in total abstraction from the actual physical factors. The chimp (and apparently all animals below man) can solve similar problems only by manipulating sensuously immediate factors (physical 'realities' as contrasted with abstract 'idealities'): animals below man have only 'practical intelligence'.

The important point is that humans can solve problems by manipulating conceptualized systems in abstraction from the immediately sensed factors: humans have not only 'practical intelligence' but also 'conceptual intelligence' or INTELLECT. Man can abstract intellectual patterns from sensuously immediate data of experience. In this exact sense, then, we may use the terms 'concrete' and 'abstract' instead of 'practical' and 'conceptual' when their use would make for more clarity.

When, therefore, we say that the educational approach at the GS is frankly intellectual, we mean quite precisely that emphasis is placed on the conceptual or abstract intelligence in contrast with the practical or concrete intelligence.

The Basic or Primitive Concepts in GS Theory

We have now a group of primitive or basic concepts that are clearly defined for our purposes: intelligence, practical or concrete intelligence,

conceptual or abstract intelligence or intellect, and the intellectual processes of abstraction. The last concept designates by first approximation (to be developed with more precision as we proceed with theory construction and refinement) those mental processes by which humans substitute tokens or counters for the sensuous immediately present factors and relations: how humans abstract conceptualized systems and patterns from immediate experience in order to interpret that experience, render it intelligible.

Let us call the factors of our sensuous immediacy of experience the 'facts' or 'data' (whichever Latin participle one may prefer: what is done or what is given, either way of looking at it, and perhaps both in fusion, will suit our purpose). Then, the conceptualized systems abstracted from immediate experience become the THEORIES that render the facts of experience intelligible by the process of abstraction. These theories, when further systematized, become the 'sciences', bodies of knowledge, or various so-called 'disciplines'.

The GS Emphasis on Theory Construction

At this juncture, our beginning statement that GS theory is frankly 'intellectual' becomes clear: what we wish to develop and enhance is our pupil's power to 'abstract', to conceptualize, to theorize. The direction of our efforts is well implied in the quotation previously given from a study by Harvey, Hunt, and Schroder, Conceptual Systems and Personality Organization (John Wiley & Sons, 1961), which we will reproduce for convenience:

> "...The greater one's abstractness, (1) the greater is his ability to transcend immediacy and to move more into the temporally and spatially remote, (2) and the more capable he is of abstracting relationships from objects of his experience and of organizing them in terms of their interrelatedness..."

The Power and Danger of Theory

Both the value and danger of theory and abstraction may be suggested by some simple illustration, appealing, of course, to the reader's good will in an effort to make an imaginative leap.

How much easier it is to redecorate a living-room, for example, by shifting about the imaginative ideas in one's mind, rather than by shifting the actual heavy furniture and doing all the actual physical operations of painting, etc. One can try out dozens of redecorative schemes in imagination--theoretically?--while one is laboriously moving heavy pieces of furniture (practical activity). The tremendous step-up power of the theorizing imagination is obvious.

But, there is always the danger that when the imaginative decorative scheme--the theory--is realized, is put to practical application, something has been disregarded in the abstractive process that makes the theoretical scheme undesirable in practice. Abstraction is a tremendous gain or step-up in power, certainly! But when the abstractive disregard of details turns out to be disregard of details crucially relevant to purposes, then we must conclude that the theory is bad theory.

Again, an illustration from economics. We all know how slow is the exchange possible in an economic system based on barter, the actual physical manipulation of goods. When for this "practical" economic system man learned to substitute the more abstract use of coins--tokens for abstracted "values" of physical goods--there was a tremendous step-up in the economic power of exchange. When paper currency was next substituted for metal specie, the step-up power of exchange was again tremendously increased. When the system of check-writing is added to the use of currency, the step-up power of commercial exchange becomes fabulous.

VIEW OF THE GOVERNOR'S SCHOOL

(Highly Condensed)

By Dr. H. Michael Lewis
Coordinator of Curriculum

Four hundred of North Carolina's most intelligent and most talented youngsters of high school age gather each summer for eight weeks of resident study on the campus of Salem College in Winston-Salem.

From the ranks of these youngsters are expected to come many of the future leaders in all fields of knowledge and endeavor for our State and our Nation.

The Governor's School is designed to play a small but highly significant role in preparing these gifted youngsters for their future tasks of creative leadership.

It should be obvious that a short period of eight weeks once in a lifetime is insufficient to give anything like a solid mastery of a field of knowledge or to perfect an important talent. Therefore, the GS conceives its role more as one of inspirational guidance and prognosis than as seeking mastery of anything.

OPEN WINDOWS ONTO THE FUTURE: acquaint these future leaders with the latest techniques and theories in their chosen fields--show them the present thorny problems in their fields that need solution--inspire them to creative activity on their own to advance knowledge in their chosen fields--all these suggest the particular flavor of orientation at the GS.

The GS has three main Areas of learning activity, each with its own emphasis on an important aspect of personality development, and yet all three thoroughly integrated and complementary.

Area I is the area of Special Aptitude Development: the area where the pupil's special talent or giftedness seems to lie, and on the basis of which he or she was chosen to attend the summer session of the GS. These areas of special aptitude are: Dance, Drama, English, French, Mathematics, Music, Natural Science, Painting, Social Science.

Two thirds of the student's class time is devoted to Area I. The materials used for teaching in the specialty are chosen with a view to acquainting pupils with the latest developments in the field, and pupils are encouraged to anticipate and to speculate on the possible solution of problems likely to arise in the future.

Area II is the area of General Intellectual Development: the area where the pupil expands his interest and knowledge beyond his own concentrated specialty to include the whole spectrum of advancing knowledge. Here are emphasized integrative principles of knowledge, by which narrow specialties are transcended and seen as incomplete parts of a larger whole. A course in the "Logic of the Sciences and the Humanities" forms the nucleus of study in this Area, supplemented by selected readings from the Great Books of the Western World series. About one-sixth of the student's class time is devoted to Area II.

Area III is the area of Personal and Social Development. Gifted people and leaders, by definition, are outstanding, and, many times, they are looked upon as being eccentric. Thus, they often have special problems of adjustment: of understanding themselves and of relating properly to society. For example, far too often highly intellectual persons or talented ones are dubbed "eggheads" and "screwballs." If the person so dubbed does not understand himself nor have psychological insight into the meaning of this social phenomenon, he may be led, by the pressure of anxiety over being rejected, to suppress development of his giftedness. Much creativity and leadership is lost to society by reason of this vicious treatment of our creative and innovative talent.

Through study of the psychological problems involved in giftedness, and by becoming acquainted with ways of solving such problems through reading biographies of talented people of the past, gifted pupils are prepared somewhat to strengthen their personalties through these insights, so as to free them for fullest development of their capacities.

Through the experience of associating with four hundred other highly intelligent and talented youngsters that are their peers, two things usually happen to youngsters who attend the GS: first, they mutually stimulate each other, and discover that there are many other youngsters like themselves, so that after all, they are not freaks and social misfits; second, they are thoroughly humbled, perhaps for the first time in their young lives, when they find out that there are other young roosters in the barnyard whose combs may be brighter than their own!

Throughout all this, the GS expects to get insights into new ways of educating the gifted, and to find out more about their needs.

Thus, the GS seeks to OPEN WINDOWS ONTO THE FUTURE for the State's most gifted youngsters, seeking thus to prepare them for the productive roles thay will be playing in the Twentieth Century Revolution, which is fast snowballing toward the fantastic future of the Twenty-first Century.

Finally, the full power of contemporary economic exchange thunderstrikes our imagination when we catch a glimpse of the abstract workings of simple bookkeeping transactions among all the banks of the world! The Chase Bank in New York credits the Geneva bank in Switzerland with ten million dollars and debits it with nine million and nine hundred seventy-five thousand, settling up the final differences between debits and credits only every three months or so, if necessary, by any actual transfer of a physical specie such as gold.

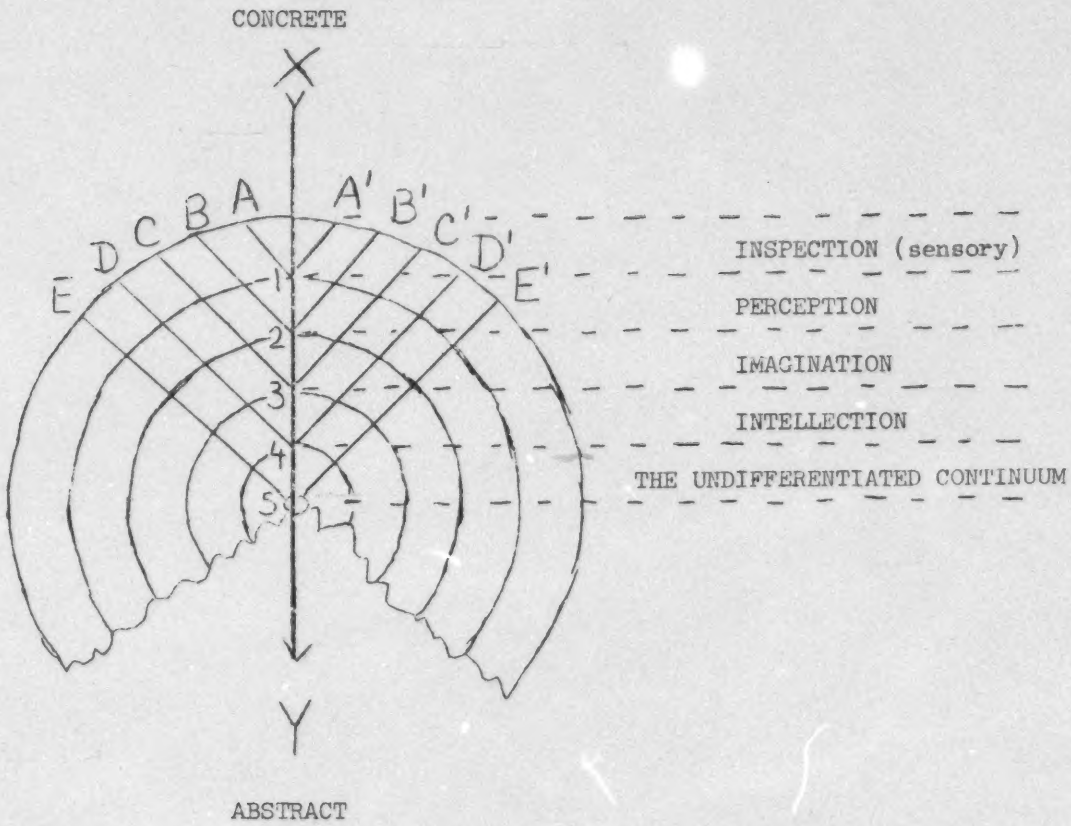
Highly abstractive manipulative systems bring a tremendous step-up in facilitative power. A theory is a sort of map: we manipulate ideal objects on a map instead of manipulating the real physical objects on the physical territory. BUT! If the map makes a mistake--in some important detail does not correspond to the territory--then it may cause us to make a tremendous mistake in practical application. Theory has great power, is the very distinguishing mark of mankind, and is also very dangerous. When man's powerful theory does not correspond to some highly relevant FACT, then mankind can wreak far more havoc with his magnified power than can any simple animal below man. This is why Alfred North Whitehead, when asked which he thought most important, 'ideas or facts', responded: "Ideas.... about facts!"

Two things, then, become important in GS theory: not only the nature of theory and appreciation of its tremendous power and value, but also its potential for danger when handled with careless disregard for the relevant facts.

The Abstractive Model

We can now ease our further path forward by constructing a model or matrix: graphic conceptualizing schemes can often keep us from becoming

nebulous and vague, and can offer us a sort of solid cantilever base for probing into the unknown or the hazy. The danger to avoid, of course, will be that of reifying our model, thus allowing it to solidify our thinking too quickly, rendering it inflexible. Models are theoretic constructs: as long as their graphics help us to disregard irrelevant facts and to concentrate more clearly on relevancies, models are helpful; if we commit the fallacy of misplaced concreteness and impute concrete factuality to them they do not have, thus distorting or falsifying some relevant fact, then they become harmful.



The model pictures diagrammatically the psychic dynamics of the process of abstraction, which forms the basis of GS theory of giftedness. The series of concentric circles represents the 'psyche' or 'consciousness' with its different levels of abstractness. On the outer surface of experience, our senses keep us in stimulus-contact with our concrete environment. As we move along the axis X-Y from the concrete surface to the abstract inner depths, we progressively detach our minds from the sensuous surface, where it is absorbed by or stimulus-bound to the concrete details or 'facts' or 'data' of experience, and we progressively become absorbed in turn by psychic dynamisms that are more interpretative and evaluative in nature. The stimulus-bind to the outer factual world gives way to the command of stimuli from our inner psychic world.

Abstraction is thus the progressive DISREGARD of facts: of the sensuously given concrete details of experience, so that the relevant aspects not disregarded but intensified by concentration may be funded into wider, more generalized systematizations. From the welter of numberless unmanageable concrete details, we abstract certain invariant patterns, whose invariance allows us to make predictions concerning our world and our conduct as planned or foreseen in that world. Thus, we move inward away from the sensuous surface of experience, and from the vantage point of greater abstractness, we formulate ordering and interpretative systems, hypotheses, theories. We make highly abstract maps to guide us through the jungle territory of factual detail.

Return after Withdrawal

We allude to a famous idea made popular recently by Toynbee, and we really mean it more than a metaphor. By abstracting we withdraw

toward the inner depths, but next, armed with interpretative theory, we return to the factual, concrete surface, where we try out our theory against sensuous observation of how it works in helping to manipulate the facts of practical life. If the interpretative system built up in abstraction works in concrete application, so that it has survival value for us--solves our problems--we store the theory away: maybe we "remember" it (we do not need to be too strict in knowing what memory means here), or maybe we engrave it into the instinctive (habitual?) or reflexive workings of our nervous and physiological systems.

For example, from the wide variety of vibratory lengths represented in the spectrum, the physiological evolution of our retinas has selected out a small band in the center--our visual system of color vibrations from the infra-red limit to the untra-violet limit--which has had survival value particular to our species. This is a case of abstraction (disregard of the "facts" above and below the narrow color band in order to concentrate more on the facts within that band which have more relevance for man's survival, supposedly) on a long-term evolutionary scale: disregard of the baffling welter of details, in order to concentrate on a selected few of proven interpretative value.

Hypnotism and the Stimulus-Bind to Facts

Consider a simple case that throws light on the nature and importance of abstraction. The rabbit frozen in its tracks by the beam of the approaching automobile headlight cannot readapt creatively and loses its life. The rabbit is hypnotized, stimulus-bound by the piercing beam of light assaulting his retinas. If the rabbit could somehow detach its sensory equipment from the concrete stimulus--bat its eyes,

for example, to break the binding stare--it could break the stimulus bind, unfreeze: it could 'abstract', move away for a second from the factual surface (here, only too powerfully factual!) toward the freedom of the inner depths, there to make use of extrapolative dynamisms that would ensure innovative action allowing it to escape.

Parenthetically, we may here point out that the traditional physiologically oriented explanation of eye-blinking, that it sweeps the eye clean of interfering dust or particles, may be only the minor part of the story. Eye-blinking effectively breaks the bind of the "stare" produced by the continuously strong stimulus of light, thus allowing one to abstract (withdraw momentarily toward the inner depths of the so-called "unconscious") and to extrapolate beyond the concrete stimulus in fixed adaptation. Static fixation in a fluent world is folly and leads often to death.

No Creativity Without Extrapolation

Back to our model: a person at A is on the sensuous surface, stimulus-bound to concrete fact, as the rabbit of the example. Only by moving to the next inner level at 1 can he extrapolate innovatively to A'. From the more inward level 1, however, his creative control over his concrete environment is limited to the surface distance between A and A'. If he moves inward along the X-Y axis of abstraction to level 2, his creative extrapolative power widens to the surface distance between B and B', which represents a much wider interpretative command of the concrete environment. And so on progressively for abstractive levels 3, 4, and 5. The deeper the abstractive level, the broader the creative command of the factual environment.

At the right of our model, between dotted lines, we give the terms for levels of abstraction which we postulate for our theory on the basis of logical experience (we are making rather free use here of the system proposed by F. S. C. Northrop in his The Logic of the Sciences and the Humanities (Meridian Book M71, 1959), which, in passing is used in Area II studies at the GS). For no living creature, probably, is there such a thing as pure sensuousness or sensation: sensory contact with the concrete environment with no power of abstraction: it is, therefore, no more than a limiting concept. (The rabbit example is an abnormal case that comes close to what might be called pure sensuousness, sensation, or sense-bind with a vibratory energy stimulus.) However, some creatures low in the evolutionary hierarchy may be considered to make an asymptotic approach to our postulated limiting case of pure sensuousness. Therefore, what we have labeled as the psychic level of 'inspection' is to be understood as having some power of abstraction but with sensory activity fully dominant. At this level of 'inspection', we may give as examples--confining ourselves to human experience--what may be called roughly pure sensations: colors, sounds, tastes, touches, aches, stresses, pains, pleasures. Let us call this the 'esthetic surface' of reality as it presents itself to humans. The language symbols which we substitute as tokens to refer to objects that we thus grasp by immediate contact with the senses--which we grasp by 'intuition', meaning thereby not some sort of mystic hunch but pure sensuous apprehension--are called by Northrop (and we shall follow his terminology) "Concepts by Intuition" of the more particular variety called "Concepts by Inspection."

The fallacy of Misplaced Concreteness

The second circular band (moving inward on the diagram) represents the second level of abstraction, which we have called the level of 'perception': the objects given here are the solid physical objects of our everyday common-sense experience. In addition to their purely sensory aspects, these objects have added interpretative aspects: they are solid, three-dimensional, and are objective (go on existing when our senses are not observing them).

This is a dangerous area for those who must build precise and adequate theories concerning scientific 'truth' and 'reality'. We learn the interpretative abstractions so early in life that they become "second nature" to us, causing us to interpret as concrete experience what is actually abstract. This is a common and extremely bothersome fallacy, which Alfred North Whitehead called the "fallacy of misplaced concreteness." A careful reading of Northrop's LSH will show clearly the workings of this fallacy, and will show the limits of pure sensation in giving us the objects of our common-sense experience. It is exactly the nature of this "fallacy of misplaced concreteness" that must be understood, if we are to guard against its insidious distortions, and if we are to understand why contemporary 20th century painting, for example, adopts the more powerful "abstract" interpretation of 'reality' as over against the traditional three-dimensional, perspectival, illusionistic, 'common-sense' art of the 17th, 18th, and 19th centuries: our so-called 'classical art', based on the laws of perspective as developed in the Renaissance, which makes external objects look so 'natural' and 'objective'.

Abstracted Sense-Imagery: Imagination

The third circular band (still moving inward on our diagram) represents the third level of abstraction, which leaves definitely the concreteness bestowed by sense-inspection and perception: at this third level, objects can be conjured up in the psyche in the form of sensuous images and perceptual qualities: they can be 'imagined' but not 'sensed'.

A fallacy in misplaced concreteness here—for example, attributing sensed reality to the merely imagined reality of the snake on the bedpost during a nightmare--can arouse serious concern as to one's sanity, if persisted in. And yet, in small ways, all too often neglected, misplaced concreteness of this sort vitiates our understanding of the nature of knowledge. For an example that has happened frequently in the author's experience: college science majors who insist that they believe in electrons and not in angels because the former are observed and the latter only imagined! One would think it important in extreme that future scientists know enough about the method of their science to realize that 'electrons' are even more abstract, and therefore more removed from the realm of either sense-observation or imagination, than are angels. If nearness to observation is to be the guarantor of 'reality'--as so many scientists popularly express it: "based on observation"--then angels are closer to sensuous observation than are electrons: angels would be located in the third band of our diagram--they can be imagined but not sensed--whereas electrons would be located in the fourth band--they can be neither sensed nor imagined!
If this statement does violence to your "common-sense," then you too, as so many science students and teachers of the author's acquaintance, are probably the unsuspecting victim of the fallacy of misplaced concreteness.

The "New" Intellect: Pure Relational Thinking

The fourth circular band represents the realm of 'pure' intellectual objects: those that can be defined by sets of postulated relations, that can be 'thought' but neither sensed nor imagined. For example, the so-called (postulated) four-dimensional "time-space" concept of relativity physics, or, the concept even of that all-important scientific item the "electron!" At this level of abstraction, we have left behind all that attaches us to what we think of as being our 'concrete reality'. We are in the realm of pure structure: but a structured (gestalted) realm nonetheless! Here is the last outpost of the so-called "conscious" mind or psyche: the area which had been fairly adequately explored by "consciousness" psychology which prevailed through the 19th century: the psychic area that seems to "make sense" because one can find some sort of "structure" in it.

The Psychic Fourth-Dimension: the Unconscious

At the deep inner core of our psyche lies the last level of abstraction and realm of withdrawal, on our diagram called the 'undifferentiated continuum': the realm of the so-called "unconscious" or, preferably, the 'depth-consciousness'. Some sort of 'gestalt' or 'structural' psychology is applicable to the levels of abstraction from 'inspection' to 'intellection' on our diagram. But only some form of depth psychology seems applicable to and adequate for exploring and understanding the 'depth-consciousness': it seems to be either nebulously unstructured (if such be possible!) or structured in strange ways (strange, that is, in comparison to our more commonsense, conscious, or "three-dimensional" type psychology): in ways that are quite different from the so-called "logical" ways of ordinary conscious thought as we have known it in 'classical' psychology up to now.

C. G. Jung has tried to structure at least a part of this murky realm--the 'collective unconscious'--with what he calls "archetypal figures" (shadow, anima-animus, wise old man, great mother, mandala, etc.). This is the same realm, perhaps, hinted at by Goethe in Faust II where he refers to the descent into the realm of the "Mothers": implying, perhaps, that all creativity issues forth from there (?). At least, in modern theory of giftedness and creativity, this deepest level of 'depth-consciousness' has been receiving more and more emphasis and attention. Witness the following quotation from George F. Kneller's The Art and Science of Creativity (Holt-Rinehart-Winston, 1965):

> "...The single most important influence on the theory of creativity today is that of psychoanalysis. According to Freud, creativity originates in a conflict within the unconscious mind (the id). Sooner or later the unconscious produces a "solution" to this conflict. If the solution is "ego-syntonic"--if it reinforces an activity intended by the ego or conscious part of the personality--it will issue in creative behavior....."

It is obvious that GS theory must concern itself seriously with this deepest level of abstraction called on our diagram "the undifferentiated continuum."

Why Area II: General Conceptual Development?

The rationale for Area II at the GS now emerges. The so-called 'new' knowledges appearing on the scene in our Twentieth Century Revolution, which we wish to introduce to our future leaders--the 'new' math, the 'new' painting, the 'new' music, dance, economics, theology, etc.--arise out of attempts to represent and interpret 'reality' on far deeper levels of abstraction than has been possible heretofore.

The fallacy of 'misplaced concreteness' that occurs in the outmoded 'common-sense' or 'perceptual' level of consciousness, which was

central during the now fading Newtonian-Euclidian era of Modern Times (16th-19th centuries), vitiates more and more our understanding of 'reality'. This shift from the old 'common-sense' system of 'perceptual' reference for interpreting 'reality' to a new and more powerful and abstract system of reference is pin-pointed in the following quotation from Werner Haftmann's essay given in the GS brochure entitled TWENTIETH CENTURY REVOLUTION, and which was the "Introduction" in Werner Haftmann's Painting in the Twentieth Century, (Vol. II, Praeger, 1965). Here is the pertinent quotation:

> "... In fact, scientists have often and earnestly pointed out that the gulf between man and objective reality has become unbridgeable due to the development of modern physics: that the more this reality has appeared to disclose its secrets, the more abstract it has become, losing all similarity to its sensory and visual images and able only to enter human consciousness in the form of those symbols with which mathematical relationships can be described ..."

This all points to a new language for use in all fields of knowledge in setting forth and representing the new view of 'reality'--a language on a deeper level of logical abstraction, which we previously referred to as a level of 'pure structure', shown on the diagram by the level labeled 'intellection'. This is brought out clearly in the following quotation from Simeon Potter's book Language in the Modern World (Penguin Books, 1960):

> "... Structure, not grammar, is the key word to the new linguistics, just as, in a different way, it is the key word to modern mathematics and to nuclear physics. The scientific revolution of our time, in relativity, in quantum physics, and in biological statistics, has led to the reorganization of the logical structure of thought itself ..."

It is this "reorganization of the logical structure of thought itself" that becomes the focal point in Area II. The Logic of the Sciences and the Humanities by F. S. C. Northrop was chosen as the central unifying text in Area II studies because it points specifically to this purpose.

Another quotation, this time from Lancelot Law Whyte's The Next Development of Man (Mentor, 1950)--how significant is that title for pupils of the GS!--will make our point clearer and more forceful:

> "... It appears that the utility of "atomistic" ideas may be provisionally exhausted, and that as a result science is being led to concentrate more on the study of pattern and symmetry, and on the emergence of new patterns. In many fields the crucial task of scientific inquiry is now to identify the structure of each phenomenon, i.e., the changing pattern of relationships (which determines its character)..."

Area II is the GS attempt to open windows onto this field of knowledge about "structure." Knowledge itself cannot be dissociated from the structures in which it is presented ("the medium is the 'massage'"?), and, as such, cannot fail to affect our way of knowing and our knowledge. If the so-called 'new' knowledges and theories of 'reality' are having recourse to this highly abstract language of 'structure', then one must know the logical basis of this new language in order to grasp the 'new' knowledge in all fields, whether it be in painting, in music, economics, mathematics, or theology. For example, if one does not understand the new language of 'structure' as exhibited in the abstract painting (now old!) of so-called "cubism," then one simply cannot read the new and far more powerful interpretation of 'reality' that contemporary painters are seeking to give us along with relativity physics and quantum mechanics and depth-psychology.

Even further, if one does not understand the new language of 'structure' as exhibited in the abstract music (now old!) of Schoenberg, one cannot understand the more powerful interpretation of the 'expressionistic' type of 'reality' it is designed to convey. Similarly in literature, if one does not understand the new language of 'structure', one cannot read and appreciate the great worth of Finnegan's Wake, or understand and appreciate the 'new' theatre of the absurd, or the 'new'

theology linked with the spectacular slogan "God is dead!" (Mind you! the GS does NOT intend to 'indoctrinate': it seeks to explain what these 'new' knowledges are all about, so that our future leaders will know how to handle them intelligently.)

The old 'common-sense' types of languages for interpreting 'reality' are no longer adequate: the common-sense or 'perceptual' level (shown on our diagram) on which they operate must be transcended by a much more abstract level of what we have called 'structure' or 'pure intellection'. That is the reason for the previous statement that "GS theory is frankly 'intellectual'", and it is for the purpose of bringing understanding and some mastery of this level of thought to GS pupils that we have designed Area II.

AREA III

Area III: Personal and Social Development facilitates--perhaps even makes possible--the success of Areas I and II. It is thus not a mere addition or novel tidbit, but an integral completion of the curriculum.

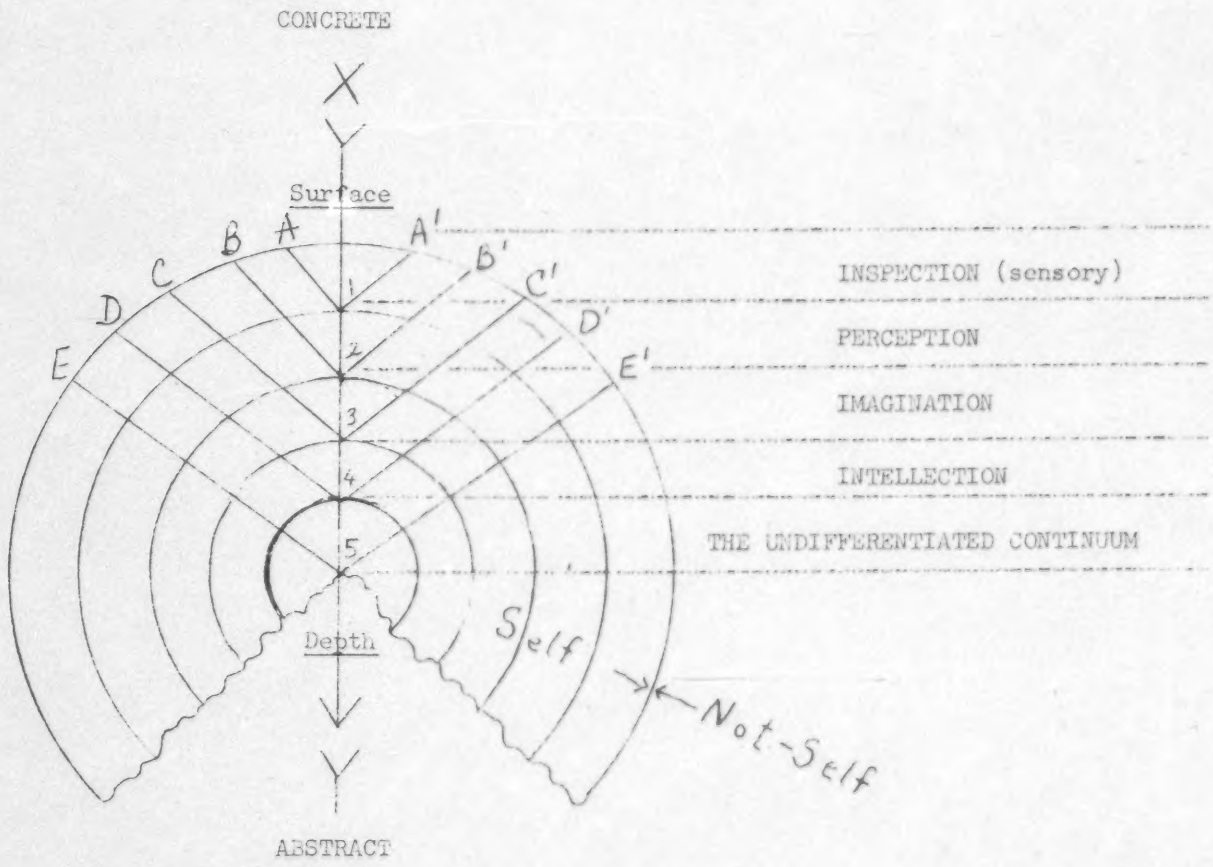
Gifted youngsters usually experience difficulties--principally of anxiety--in relating both to others and to themselves. These difficulties arise from their very giftedness. New and strange situations and ideas arouse some anxiety in us all. Definitely is it so when adolescent youngsters at the Governor's School probe with highly trained teachers into the depths of new theories and abstractions in their Area I specialties. Even moreso will this be the case with Area II, which is deliberately designed to confront gifted youngsters with the latest "way-out" abstractions, generalizations, and theories that undercut the more fragmented special disciplines. As most of us know, the philosophical implications of the contemporary sciences and arts are strange and disconcerting.

Thus, the gifted pupil meets two sources of anxiety, the effects of which tend to make him hide his light of giftedness under a bushel. First, expression to his peers of the new strange ideas he comes up with in his creative thinking in Areas I and II all too often provokes their ridicule and draws from them epithets of "screwball," "egg-head," "useless dreamer," and others. Even again, if the innovating idea is so "way-out" as to be strange and "impractical" or "unorthodox" to the teacher, the latter may conclude that the youngster is being "smart-alecky" and may then add to the ridicule already directed at him by his peers.

Second, the deeper the power of abstraction (following our diagram) goes in order to come up with innovating re-structurings of forms and theories, the more the effort stirs up the unconscious depths, which seems to bring with it twinges of anxiety.

The first-mentioned source of anxiety is well known and needs little explanation. The illustration of Alexander Graham Bell is sufficient to put it succinctly. Whenever friends and neighbors would come to visit the Bell family, they were usually taken aside and whispered to: "Pay no attention to Alexander! He's a little 'teched' in the head: he thinks he can talk over wires!" But the second-mentioned source of anxiety needs some elaboration in order to make plain the latest theory of creativity and its power to arouse anxiety (a point somewhat neglected in the literature, and which we at the GS believe needs emphasis).

For convenience, let's repeat our diagram 'Model of the Mind':



I have explained before why I prefer to call the deepest center of the mind--represented by the dark cross-hatched circle here--the "undifferentiated continuum." This is the area that is usually spoken of in depth psychology variously as the "unconscious," the "sub-conscious," the "pre-conscious," the "collective unconscious," etc. (At least the last two terms are used as more special areas of the over-all "unconscious.") My term, the "undifferentiated continuum," merely means to include them all, and, possibly, to help point up an important characteristic of this "region" of the 'mind' in contrast with the so-called "conscious" areas. This contrast between the "conscious" areas, which are highly differentiated, and the undifferentiated continuum is brought out pointedly by the following representative quotation from Anton Ehrenzweig's The Psycho-Analysis of Artistic Vision and Hearing (New York, 1965):

> ...William James, Sigmund Freud, and recently the Gestalt Theory, independently of each other, drew attention to the articulating tendency active within our (surface) perception. We tend for the most part to notice simple, compact, precise forms, at the same time eliminating vague, incoherent, inarticulate forms from our perception..... Freud, who also noticed the articulating tendency of our observing mind, found that form experiences coming from lower layers of the mind, like our dream visions, tended to be inarticulate; they appeared to our observing surface mind as altogether chaotic and were difficult to grasp.

Our diagram may be seen in the light of the foregoing quotation: those levels of abstraction toward the surface labeled (from surface toward depth) "inspection," "perception," "imagination," and "intellection" are gestalting activities--the "articulating tendencies" of Ehrenzweig--in contrast with that undifferentiated continuum, which, as Ehrenzweig puts it, appears "to our observing surface mind as altogether chaotic and difficult to grasp."

Most theorists today seem convinced by accumulating evidence that creativity has its source in the unconscious or preconscious, and, after tension-producing struggle, results in articulated structures of the surface (conscious) mind. George F. Kneller in The Art and Science of Creativity (New York, 1965) sums up well the most representative aspects of recent theory:

> ...The single most important influence on the theory of creativity today is that of psychoanalysis. According to Freud, creativity originates in a conflict with the unconscious mind (the id). Sooner or later the unconscious produces a 'solution' to this conflict. (p. 28)

> ...The main contribution of the neo-Freudians is the principle that creativity is the product of the preconscious rather than the unconscious mind. The preconscious mind differs from the unconscious in being open to recall when the ego is relaxed. Creative thinking occurs when the ego voluntarily and temporarily withdraws from some area of the preconscious in order to control it more effectively later. Creativity is a regression permitted by the ego in its own interests, and the creative person is one who can draw on his preconscious more freely than other people. (pp.33-34)

Again, the same strain of thinking from Ehrenzweig:

> ...But it is not only the modern artist who knows of inarticulate form experiences, any act of creativeness in art or science knows such experiences whenever the creative consciousness reaches down into the deeper layers of the mind..... It will become possible to demonstrate that any inarticulate form experiences, whether in the dream, daydream, joke, creative vision, etc., emanate from the lower layers of the mind, they are produced whenever these lower layers are stimulated into action. (pp.6-7)

It has been known for a long time that highly creative dreamvisions appear vague and inarticulated to the mind awake, which has been paralyzed during the unconscious state of sleeping. However, that this change in levels of consciousness is not confined to those definite changes between waking and sleeping is not so well known. Ehrenzweig quotes the German student of creative activity, Varendonck:

> ...Varendonck proved that similar inarticulate, dream-like form experiences occurred also in other states of mind where similar shifts of consciousness take place. The alternation between waking and sleeping may involve a stronger and more lasting displacement of mental energy between the surface mind and the depth mind. But the waking consciousness, too, knows of shallower and quicker alternations that bring about the same result--a temporary advance of inarticulate, dream-like perceptions. (p. 7)

It seems to be this momentary--and therefore difficultly observable--oscillation between levels of consciousness (between the articulating surface mind and the flexible unarticulated depth mind) that is the key to creative activity. Previously, I gave the example of the stimulus-bound rabbit, paralyzed into inactivity by the hypnotic stimulus-bind of the onrushing automobile's headlights, so that it could not change (perhaps by an eye blink?) levels of consciuosness, thus allowing a 'creative' restructuring of his situation. Since this is such an

important point, let us give another quotation from Ehrenzweig, who puts it so clearly:

> ...Our observing surface mind has at its disposal only fully articulate static gestalt structures for its task of grasping the utterly mobile and fluid structures lifted from the deeper layers of the mind by the oscillations of consciousness. (p. 11)

And further:

> ...We shall see that any act of creativeness in the human mind involves the temporary (cyclical) paralysis of the surface functions and a longer or shorter reactivation of more archaic and less differentiated functions. The form processes conceived on this low undifferentiated level are then--wholly or partly--rearticulated ('translated') into more differentiated structures which the surface mind can grasp. The artist wrestles with his inarticulate inspiring vision in order to mound it into more articulate forms. (p. 18)

It is important not to confuse the static day-dreaming descent into the lower levels of 'abstraction' with the dynamic 'withdrawal-and-return' (to make use of Toynbee's famous phrase) of the creative act. The day-dreaming is peaceful and relaxing: creativity is tension-laden and frustrating. William James noticed the difference between these two states and Ehrenzweig picks him up in these words:

> ...We distinguished between these transitive depth perceptions which lead back to articulate surface perceptions and the inert static depth perceptions which lacked the dynamic tension leading back to the restoration of surface perception. Such static depth perceptions are the visions of dreams, day-dreams, or the mystic tend to 'forget' these static depth perceptions, they appear as mere 'gaps' because no translation into more articulate structures takes place. Hence also the often painful tension which ususlly besets the transitive creative states is lacking; the tension of the transitive states can (at least partly) be conceived as the signal of the superego's interference with the process of articulation (translation). (Italics mine.)

We may now come to the very heart of our theory about Area III. The foregoing quotations give clearly the mechanism of creativity as we conceive it (following the literature) at the GS: the descent into the deeper layers of the mind (the undifferentiated continuum of our diagram); the 'withdrawal and return' with all its anxiety-producing tension caused by (1) the frightening descent into the unfamiliar formless depths (often peopled with fearful distortions); (2) the tremendous mental strain of translating vague intimations into articulated forms;

and, finally (3) the fight with the superego in order to replace its socially accepted conventional forms and ideas with the upsetting, and often subversive, innovative artistic forms and scientific theories brought back by the 'withdrawal and return'. Every creator or innovator, it seems, must wear a crown of thorns imposed by the reigning superego, be it the Sanhedrin or the local Mrs. Grundy.

In Area III at the CS, we try to give our creative youngsters some insight into the process of creativity and its anxiety-producing mechanisms. As high school youngsters of a crucial age, with little understanding of their own mental and emotional processes and the problems that arise from society's usual misunderstanding of its genial leaders, these youngsters are ripe for retreating into uncreative conventionality, there to hide their God-given creative light under a bushel.

The reading materials and especially the discussions stimulated by trained teachers in Area III do much to cause our highly intelligent charges to understand the sources of their own anxieties that arise from their creative activities. We believe that the first step toward relieving and preventing anxiety is to understand its source and its mechanisms. To the extent that we succeed in Area III, we free the youngsters who are to become our creative leaders from those anxieties which could, possibly, cause them to turn aside from the hard task of realizing their full creative potentials, and of relating themselves to their fellows in life so as to share their giftedness humbly and lovingly with others.

Thus, it can be seen that if the goals of Area I and II are to be achieved with any measure of success, Area III makes that achievement possible by making the attempt to handle the inevitably resulting anxieties that accompany all tension-laden creativity and most ridicule-provoking innovation.

STREAMLINED ILLUSTRATION OF GS LESSON

By H. Michael Lewis

(NOTE: This is not intended to be a verbatim illustration of an actual class session that took place. It is highly idealized, of course, and streamlined for brevity. Its purpose is to suggest the SORT of teaching that is aimed at--moving toward deeper and deeper levels of generalizations and abstractions from units (facts), through classes, relations, systems, transformations, implications, etc., as suggested by Guilford, Gallagher, and others in order to realize the full potentials of creative abstraction of which gifted pupils are capable. Some of the "ideas" in this particular dialog, however, actually were expressed by pupils at the GS during a discussion in Area II.)

* * *

Teacher: Okay, students, we've been talking about 20th century music ... about what kind of knowledge art, and particularly music, is ... and how it fits into the general "style" of 20th century knowing ... Now let's listen to a piece of 20th century music and see what we can make of it.

(Teacher plays a tape-recording of the first 18 measures of Anton Webern's Op. 27, Variationen.)

* * *

(NOTE that the teacher starts here with what Northrop--in his book The Logic of the Sciences and the Humanities, which is the unifying text for Area II--calls the "pure facts": i.e., what is immediately apprehended by the senses--hearing in this case.)

* * *

1st Student: Man, that's weird! ... sounds horrible and doesn't make sense!

2nd Student: You're just not used to it ... I've been listening to the same kind of stuff on the Wake Forest FM station ... you get used to it ... but I'll admit it sounds more like just plain noise than like music.

3rd Student: Such junk shouldn't even be called music!

4th Student: What is "music" anyway? Some Hindu musicians were at Wake Forest last year ... what they played didn't sound like "music either! Did you ever hear any real Japanese stuff?

Teacher: Well, let's don't argue about whether it's music or not ... maybe we can just say it's some kind of new sound that is different and might be interesting ... something like a new sound from outer space.

Anyway, a serious musician--I won't say a great one, or even a good one: you'll be the judge of that after we've tried to get at

the facts and find out what he's up to--wrote the piece. He was an Austrian named Anton Webern, and he called the piece Opus 27, Variationen.

Here are xeroxed copies of the first 18 measures ... you each may have your own copy to study and mark on. (Hands out copies.)

* * *

(NOTE that the deeper level generalizations and implications were premature: the students had not gone thoroughly enough into the facts just by the first over-all listening. She has now guided the pupils to a thorough detailed exploration of the units (facts) by means of the printed score, before allowing them to go on to classifications and relationships. They will, thus, be ready to make evaluations on the basis of a thorough knowledge of the facts, their relations, and the as yet unnoted transformations that occur in the music.)

* * *

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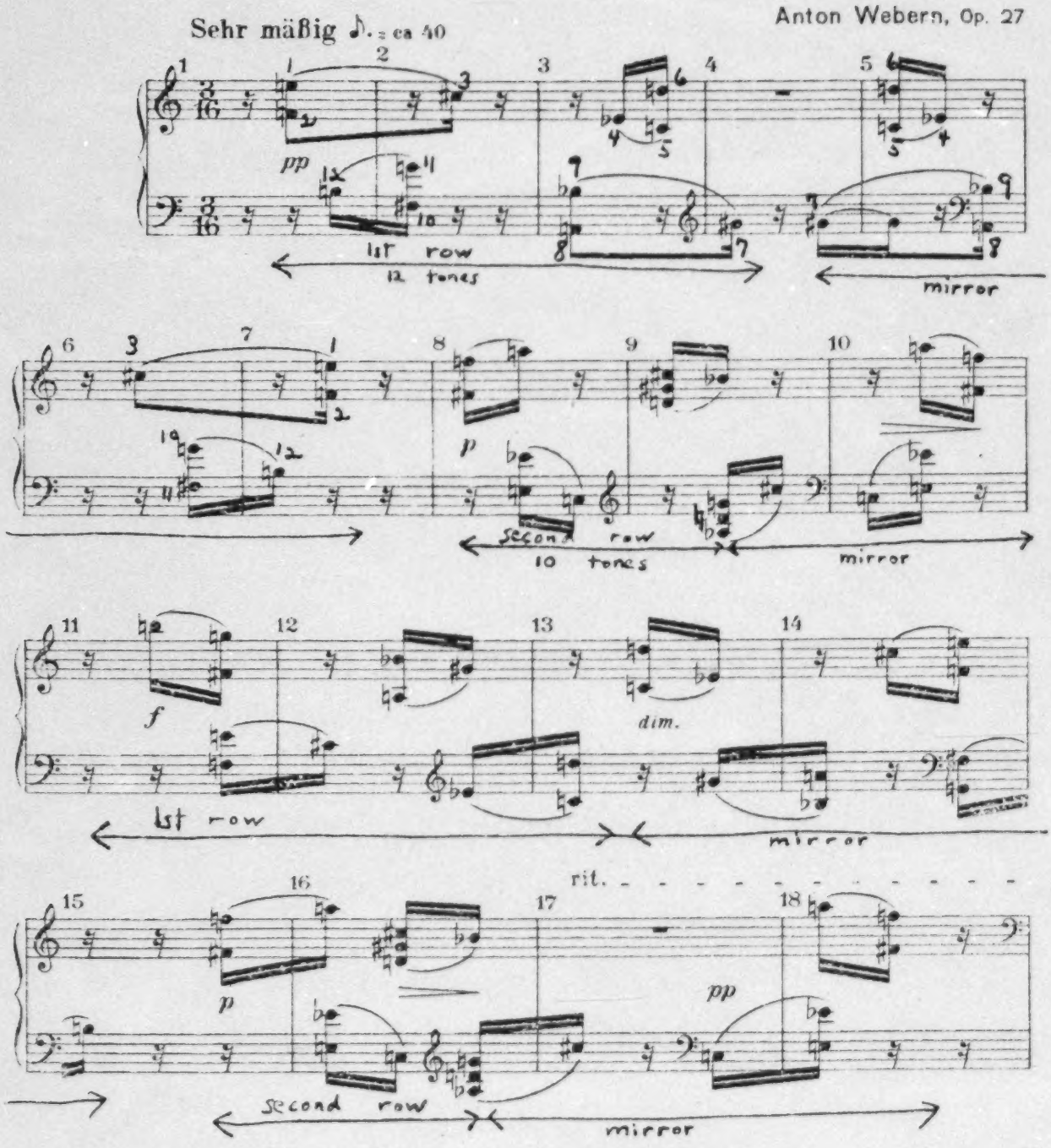
VARIATIONEN

I

Anton Webern, Op. 27



Teacher: Now, first, count the number of notes in the first four measures down to and including the g-sharp at the beginning of measure four.

4th Student: Do you want to know the total number, or how many different ones?

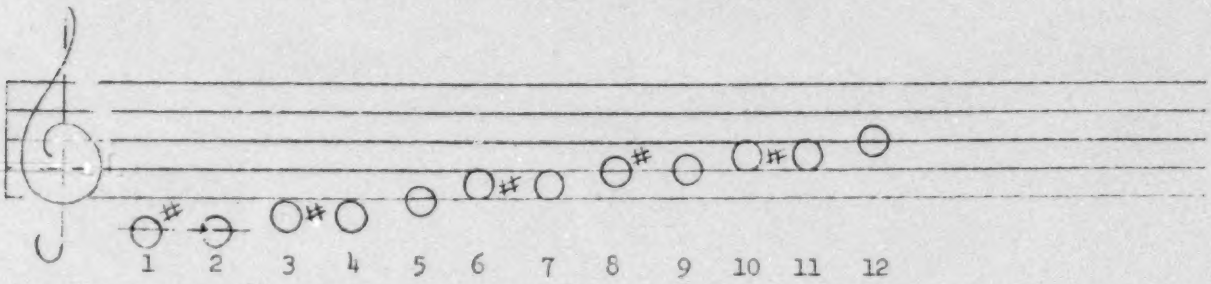
Teacher: First, just the total number of notes ... disregard whether or not any are repeated.

4th Student: Then, there are obviously 12.

Teacher: You're right: it is obvious. Now draw a staff quickly on a sheet of paper, and, starting with middle c, put the notes in order chromatically right on up the scale, disregarding whether they are in first or second octave.

* * *

(NOTE: Students draw staffs and arrange notes as follows:



(NOTE: The teacher has forced the pupils to take the first "scientific"--opposite of "esthetic" observation of pure facts--step of ORDERING the facts of observation, these important "scientific" operations of measuring and ordering. The teacher has caused the pupils to move from bare facts, to classification, and on to relation.)

* * *

1st Student: He has used all the notes, whites and blacks, starting with middle c and up to the c an octave above ... and he hasn't repeated a single note!

Teacher: Would you say, then, that in the first four measures he has used any sort of "scale" at all?

* * *

(NOTE: The teacher, by skillful questioning, has forced the pupils now on up one step to "systems"--the notion of "scale".)

* * *

2nd Student: Well, it isn't a scale the way we have been taught to make major and minor scales. About all you can say is that he has a sort of chromatic scale ... but that doesn't mean much.

Teacher: Then, would you say he has somewhat disregarded the rules or ways of composing music that have been built up in our Western Culture during the last four centuries? I mean the use of "keys" and "modulations" from one to another of the related keys?

3rd Student: Yes, he seems to have jumped the track of 18th and 19th century music ... but that doesn't mean that he doesn't have some kind of order or pattern in his music. Just compare the two groups of notes in measures one and two as against measures three and four. There's a relationship of pattern between the right and left hands in the first group that is reversed between the hands in the second group.

* * *

(NOTE: The teacher has now forced the pupils on to the deeper level of generalization: "transformation" from one type of "scale" music to another type without scale.)

* * *

4th Student: Yes, the right hand goes 2-1 and then 1-2, while the left hand is 1-2 and then 2-1 ... a sort of mirror image.

1st Student: But, if you take the pattern as the notes actually sound--you can't hear right hands and left hands, you know: you have to see that--it makes two group patterns that are alike: 2-1-2-1 and 2-1-2-1.

Teacher: Okay, now let's go back to the tone row of twelve notes we made from middle c up to the next octave, and using the numbers of the notes from 1 to 12, arrange the 2-1-2-1 patterns of both groups. Next, do the same thing giving the letter names to the notes instead of the numbers.

* * *

(NOTE: Students make two patterns as follows:

	5		8		11		3	
A.	-	--	-	-	--	-	-	-
	6	12	7	2	10	4	1	9
	e		g		b		d	
B.	-	-	--	--	-	-	-	--
	f	b	f#	c#	a	c	c	g#

(NOTE: Teacher finds one student with a correct paper, has her copy it onto the blackboard, and asks other pupils to correct their own papers by the model.)

* * *

Teacher: All right ... do you notice anything like what we are used to calling a "melody" in the way the tones follow? Sarah, please go to the piano, and play them.

* * *

(NOTE: The teacher has now gone back to the sensuous observed facts, BUT WITH A DIFFERENCE!)

* * *

Sarah: Boy, they surely are hard to play--to read, I mean. Let me do it two or three times to get the hang of it.

(Sarah finally plays the notes correctly up to a tempo that should be connective enough to make a melody.)

1st Student: Doesn't sound like any melody I ever heard! Stephen Foster would turn over in his grave! ... violates all the rules for writing good melodies given in the harmony book my piano teacher makes me study out of!

2nd Student: The two notes sounding together don't make much harmony either! You sure can't pick out any tonic chords, or dominants or subdominants. I'd like to hear a barber shop quartet harmonize on that like they can on Sweet Adeline!

3rd Student: He uses all 12 notes and repeats none ... you might say he's being "democratic" letting each note do his own thing.

4th Student: That's what makes it so different ... usually a composer repeats and emphasizes the main notes in a key: first, the tonic, then the dominant and sub-dominant. The tonic especially is sorta like the prima ballerina in a ballet.

1st Student: If he's trying to get away from old-fashioned melody and harmony, he sure did pick the right way to do it!

Teacher: Well, what have we found out so far? Let's sum up a little bit so we'll know where we stand before going further.

1st Student: It isn't the kind of music--if you call it 'music'--that we are used to.

2nd Student: I've heard of a "tone row" kind of stuff that is supposed to be a new wrinkle in music ... all notes of the scale--if you can call it a scale--are supposed to be used before any note can be repeated.

3rd Student: It has a definite pattern, though; and I'm beginning to get hooked by it and find it sorta interesting.

4th Student. It doesn't have what we would call "good melody" and it sure doesn't follow any rules of harmony we have learned. It sounds dissonant ... and it doesn't seem to be in any particular key, such as the key of "f" or of "g."

Teacher: The technical name--maybe some of you have read about it somewhere--for having a key and modulations to related keys is "tonality" ... so, the technical name for the opposite--which seems to be the sort of piece this is--is "atonality." Maybe some of you have run across that term, too, in your reading. You'll hear a lot about "atonality" if you read about 20th century music.

Sarah: It's hard as heck to play!

Teacher: Okay, that's about as far as we need to go now. We've had a look (and a hear) at the bare "musical" (or un-musical?) facts.

Next, we've tried to classify the facts ... to see what kind or sort of music it is, helping to do that by contrasting it with the kind of music we're used to. We certainly can't classify it with 18th and 19th century music very easily; or, at least, with most of it. If we must classify it, we'll have to create a new sort or class and call it 20th century stuff, or something like that. Sometimes it's called "serial music."

Also, we've established some relationships among the notes and groups of notes, so that we can make out certain patterns of sound. It's not just chaotic and unplanned ... it has a sort of system about it, as you have pointed out. the musician seems to be "composing" something.

And, finally, at least Johnny says he is beginning to "get hooked" and finds it interesting.

Next--on your own--do the same thing we have already done to the next three measures, beginning with the g-sharp at the end of measure four and ending with the c/f in measure 7.

* * *

(NOTE: Pupils do work ... teacher has pupils with correct work put their patterns on the board for all pupils to correct their own work by.)

* * *

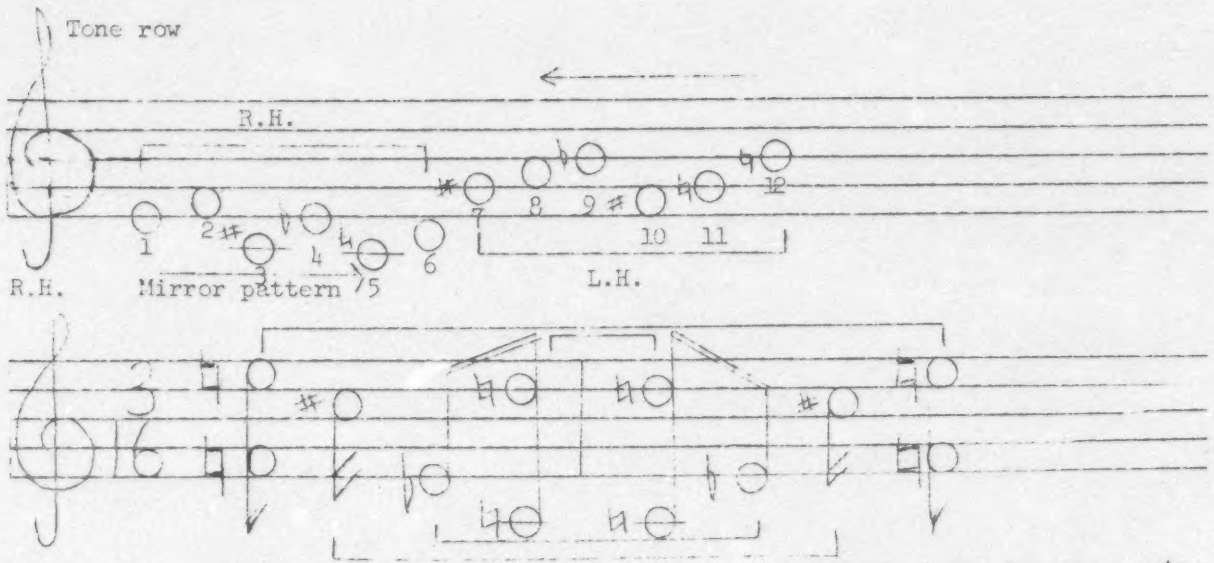
1st Student: Hey, kids, look! He does exactly the same thing he did before; but he does it just backwards ... the second is also a tone row and is a mirror image of the first pattern ... just like Jan and Jill in the funny papers or identical twins.

2nd Student: That makes some real funny stuff ... mirrors within mirrors ... if you count that the right and left hands are sorta mirror images of each other, and now the two tone rows are arranged as mirror images of each other.

Teacher: Yes, you'll find lots of what we can call "transformations" in the piece. I'll pass out some more xeroxed copies I have prepared for you to show clearly the tone row in its ordered form, and to show the mirror image you have discovered.

(Teacher hands out the following xeroxed forms:

VARIATIONEN, Op. 21 A. Webern



Teacher: Notice one thing ... you count the second half of the tone row going backwards in the left hand.

2nd Student: Okay, Sarah! Get up there with your back to the keyboard and play it like you did before and it'll come out okay: Just backwards!

Sarah: You think it's funny, don't you! Well, give me a minute to shift my mind's gears into reverse and I'll try it.

(Sarah finally gets the hang of the piece and plays the first seven measures that make the mirror patters.)

4th Student: Say, that is different! ... neat, too, when you once dig into it and see what's going on. At least it's not the same old stuff as Brahms' Lullaby that I'm bored stiff with, or as Three Blind Mice that so much music sounds like!

1st Student: Well, I like Brahms' Lullaby!

4th Student: That's 'cause you're still tied to your mammy's apron strings and want to be sung to sleep!

1st Student: Oh, shut up! I guess I can like them both, can't I?

Teacher: That's right, Jennifer. We don't have to throw out the old in order to appreciate the new.

But, back to the piece: why in the world do you think a 20th century composer would want to write music like this?

Johnny: Well, I learned last summer at the Governor's School that modern science has changed our view of the world ... that it is made up of a sort of logical network of cause-and-events that connects everything together. According to the way some of the way-out guys

see things today, everything kinda stands out for itself--unrelated by some sort of over-all rational scheme--like what is called a "surd" in mathematics. Things in reality don't come all nicely connected together like people in the 18th and 19th centuries believed. We live in a so-called "absurd" world: made up of a lot of unconnected "surds."

Now, it seems to me---and I know I'm just sorta hypothesizing all over the place, but I'm still trying to base what I say on the facts observed in this music right before me---that Webern's music has something to do with this 20th century style of thinking. Webern starts with a bunch of "surds"--sounds not connected in an already ordered way like what we call in music we are used to the diatonic scale and what the teacher called a while ago "tonality." Then he takes this rather "absurd" world of sounds and makes them into an ordered world of his own: sorta doing his own thing, without sticking to the way Bach, Beethoven, and Brahms did it. Maybe he's doing his own thing like God did in Genesis: he creates a world out of an absurd chaos or void.

1st Student: You sure got brainwashed up at that Governor's School!

Johnny: Well, yes, I did! But not exactly in the same way you are using the word. They washed out of my brain a lot of prejudices and made me see that there could just possibly be some new ways of seeing and doing things in this world. And they made me not afraid to dream up "kooky" ideas as I've just done on this Webern stuff. It's what you call "divergent" thinking---getting off the track---and not always "convergent" on the same old accepted answer. There could be some sense to what I've said about this Webern music: he certainly was a man of his time, you know; and such ideas were certainly in the air among scientists, writers, and artists of all kinds, men who were his friends and with whom he drank and talked. Why shouldn't he have picked up such ideas?

4th Student: I think Johnny's got a pretty good idea ... he's expressing it differently, but I read something just the other day in a book on modern music by a guy named Machlis where he compared doing away with the tonic in music to doing away with gravity in the universe like Einstein did.

3rd Student: What Johnny says also checks to some extent with what Webern himself said--or what a book by a guy named Austin says he said. I've got it here in my notes: "...Thus <u>building a tonality</u>, but one that uses differently the possibilities offered by the nature of tone ... the difference rests on a system that makes 'related to each other' (as Arnold expresses it) the twelve different tones up to now in Western music ..."

2nd Student: I think the music is what Northrop calls "art in its first function" ... it doesn't use symbolic reference to anything beyond itself, like some of the old classical Western music did: referring to Christian dogma, for example, in much religious music. But, Webern's tones don't exist separately for themselves, either. The chromatic twelve-tone scale may be a bunch of "surds," but they cease being surds when Webern gets through relating them to each other.

4th Student: Then, if what you say is true--and I think the facts of the music suggests it--Webern's music resembles what is called "gestalt psychology" where the elements get their meaning from the network of relationships, like Northrop says in telling what a "Field Concept by Inspection" is at the bottom of page 98 in the textbook.

Teacher: Well, all your implications and interpretations are apt. They might be somewhat far-fetched in certain cases, and quite probably the composer himself didn't have modern science and psychology directly in mind, but he certainly was in a climate of learning in Vienna where artists and scientists were discussing such matters.

But, let's dig more into the facts of the music. Maybe they can throw more light on the interpretations and evaluations.

So for your homework, do the same as we did today in class for the remainder of the 18 measures of the Webern piece: see what new facts and ideas you can come up with! And, all of you musicians: learn to play the piece for us!

* * *

NOTE how the teacher has guided the students to deeper and deeper levels of generalizations and abstraction, following fairly closely the order suggested by Guilford's six "depth dimensions" of his model "structure of intelligence": (1) units (facts), (2) classes, (3) relations, (4) systems, (5) transformations, (6) implications. Of course there is some skipping ahead, dodging back, and skipping over. Pupils do not always have to be guided and suggested into action by the teacher: they leap ahead naturally on their own. But, with foresight and with patience, the teacher has worked toward the goal of deeper and deeper levels of abstraction--which fulfills, in application, the theoretical goals of the Governor's School.)

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